



UNIVERSITÉ
DE GENÈVE



FACT storage at ISDC

Space, power supply and storage
configurations

System requirements

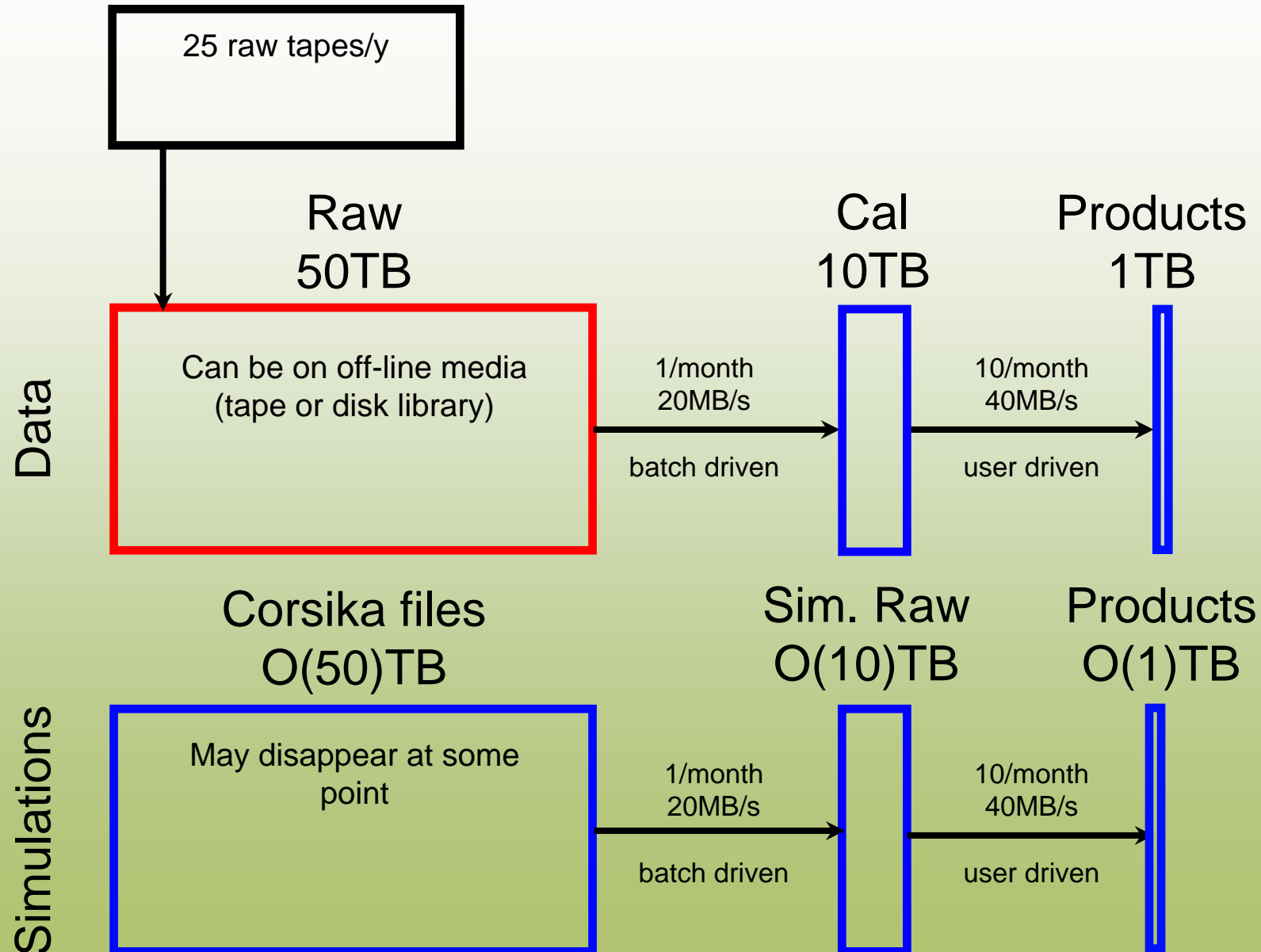
- Storage capacity
 - 70 - 100TB per year, scalable 5 years project
- Backup
 - 1 copy of raw data in a different building
- Archive I/O performances
 - 250MB/s
- Manpower for setup and maintenance
- Transparent access

Physical space available

- Barn
 - 40 kW, 2 racks, 10 kW cooling
- Pavillon
 - 45kW, 3 racks, 40 kW cooling
 - Space available until 2014



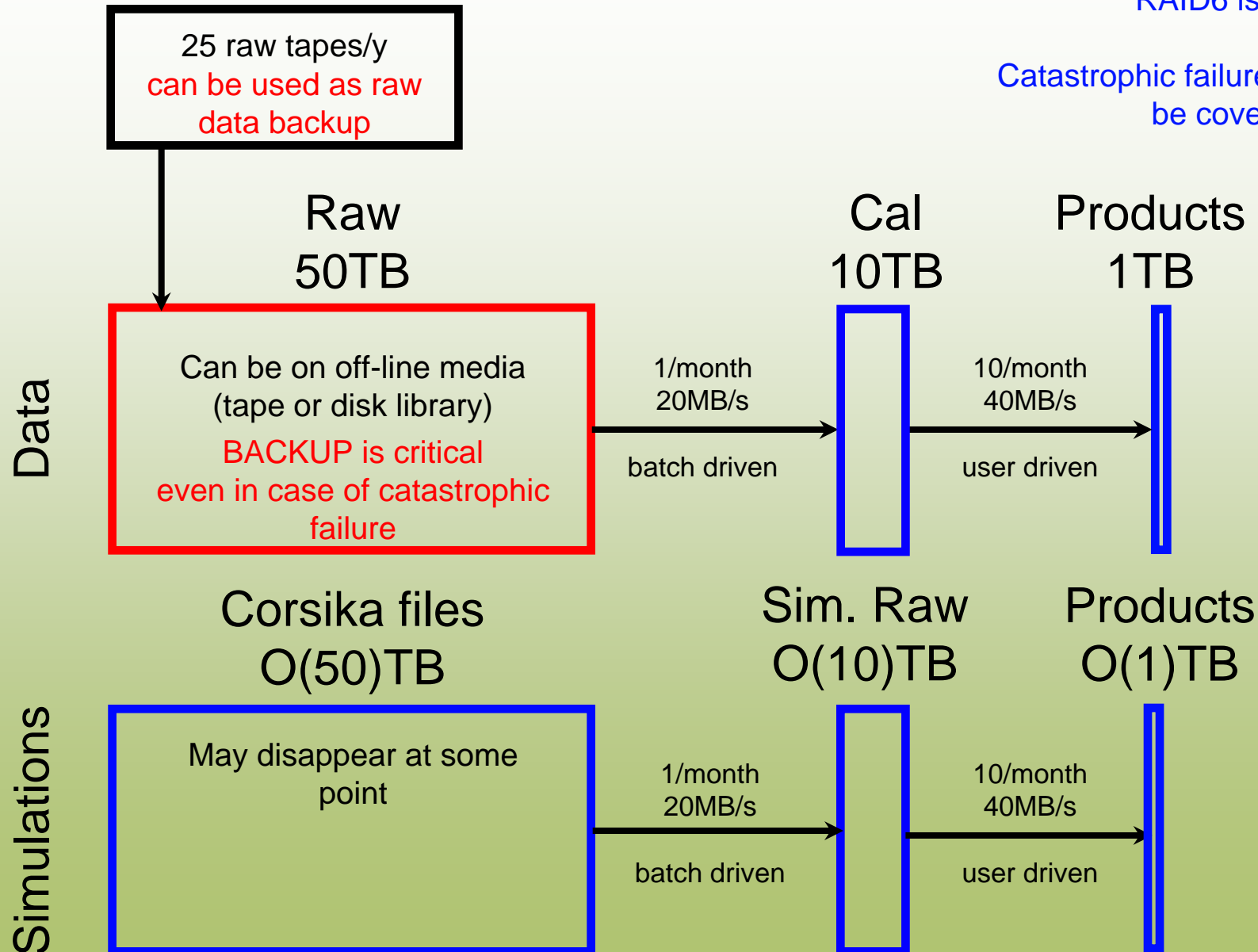
Data flow (sizes are for one year)



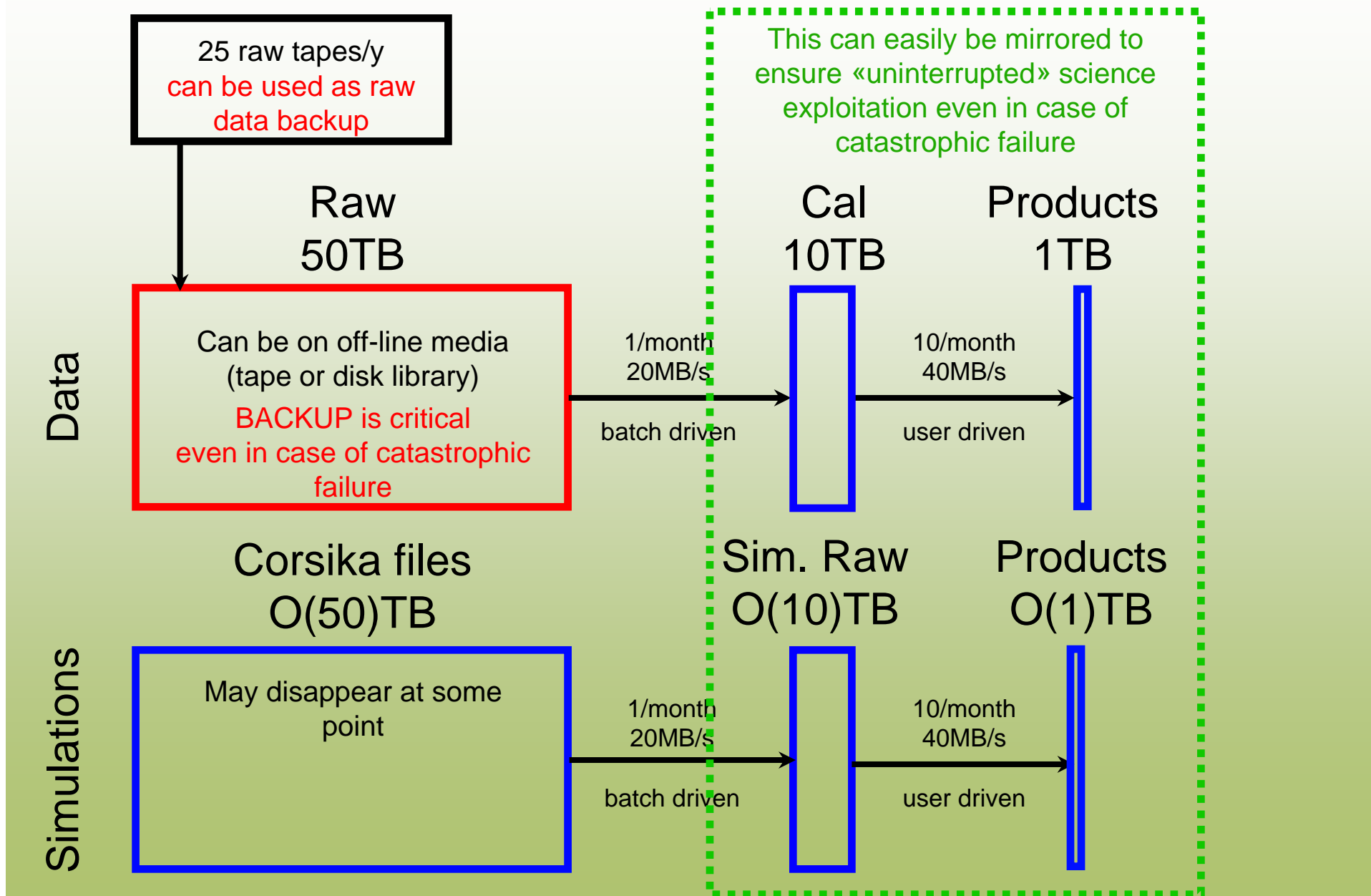
Backup

Blue boxes should be safe for
double hardware failures (i.e.
RAID6 is OK)

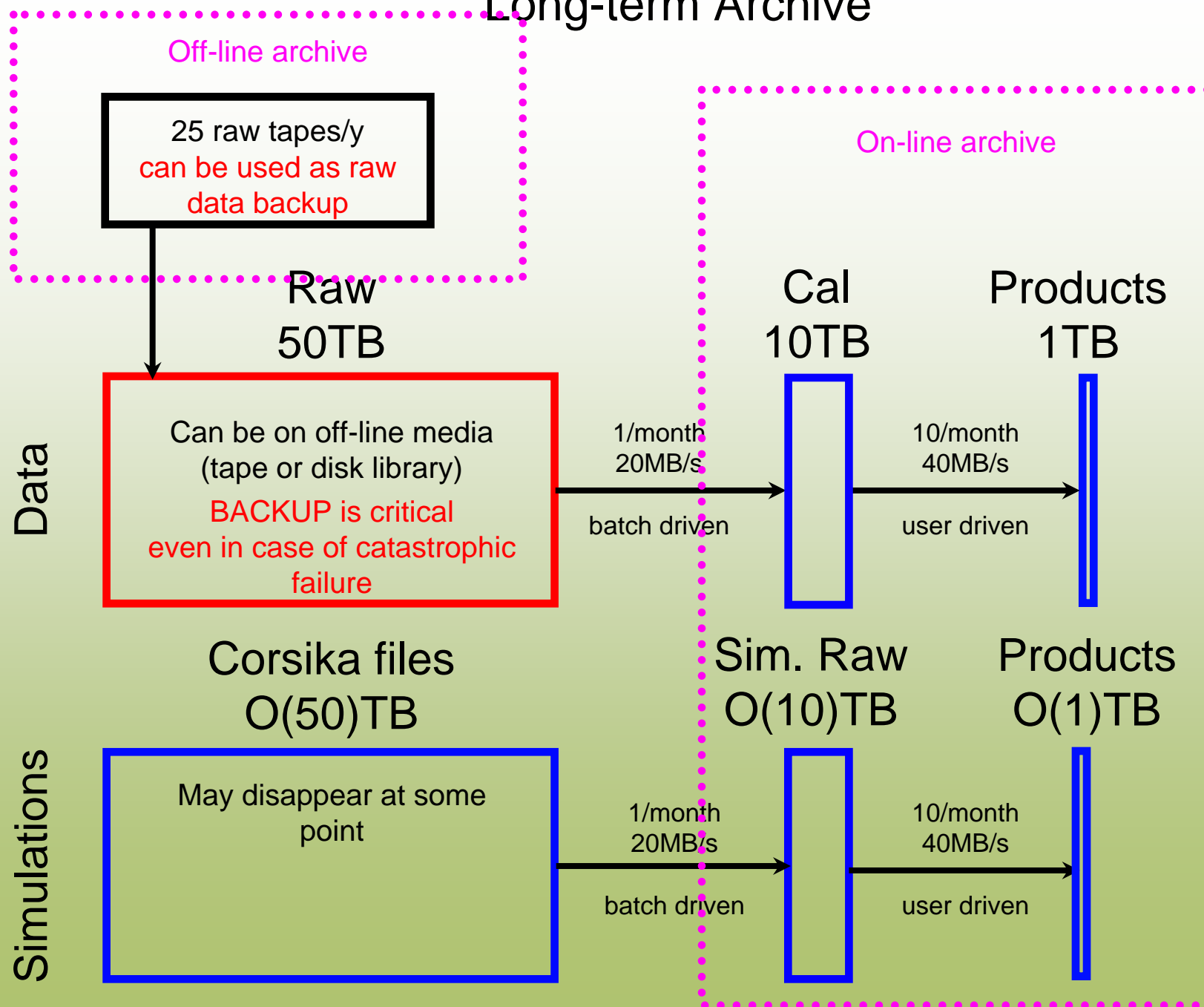
Catastrophic failures do not need
be covered



Possible Mirror



Long-term Archive



Possible solution for raw data storage

- Tape library
- Disk array (tape robot not really needed)
- MAID array (tape robot not really needed)

Hardware Solutions

- SUN: disk cache + tapes
 - Proprietary software
- SGI: disks with idle sleep
 - Proprietary software ?
- Hitachi
 - Open Source software



COPAN 400M MAID Solution



1,792TB

Competing Solution

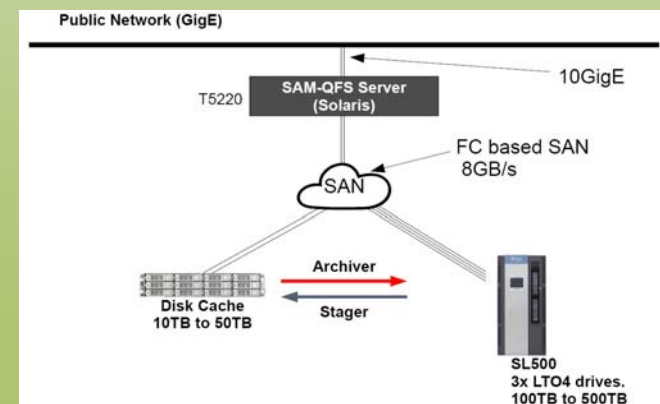


1,792TB



SUN

- 10TB disk cache + 100TB tape drive
- 1 rack (1 SL500 + 1 disk cache + 1 server)
- Power: 1430W (330 -> 660 + 450 + 650)
- Acquisition: 91k hw + 200k sw
 - 4 years budget 116k CHF
- Acquisition: 117k hw + 101k sw
 - 4 years budget 480k CHF



SGI

- 10TB disk cache + 100TB tape drive
- 1 rack (1 MAID + 1 disk server)
- Power: 1826W (426 -> 580 + 1400w)
- Acquisition: 127k hw + 59k sw + 28k srv
 - 4 years budget 138k hw + 177k sw + 62 k srv

Hitachi

- 100TB RAID6
- 1 rack (1 AMS + 1 server)
- Power: 1070W (770 -> 2500 + 300w)
- Acquisition: 69k hw + 0 sw + 15k srv
 - 4 years budget 200k hw + 0 sw + 18k srv

Backup library

- Tape robot + backup server
- 130 TB
- Power: 1430W (770 -> 2500 + 300w)
- Acquisition: 63k hw + 0 sw + 4k srv
 - 4 years budget: 75k hw

Summary for 100TB

	SUN	SGI	Hitachi
Racks	1	1	1
Power (W)	1430	1826	1070
Price	218 - 291k	214k	84k

Summary for 500TB

	SUN	SGI	Hitachi
Racks	1	1	1
Power (W)	1760	1980	2800
Price	407 - 700k	591k	302k
Transparent access	SAM FS	StorNext	NFS (GlusterFS ?)

I/O access Ok in all 3 configurations